Automated Critical Peak Pricing (Auto-CPP) Pilot for Large FacilitiesTest Plan

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Background: California utilities have been exploring the use of critical peak prices (CPP) to help reduce needle peaks in customer end-use loads. CPP is a form of price-responsive demand response. Recent experience has shown that customers have limited knowledge of how to operate their facilities to reduce their electricity costs under CPP. At the same time LBNL has been conducting research to demonstrate how price-response could be automated using XML-based communications with Energy Information Systems and Energy Management and Control Systems. Fully automated electric load shedding has taken place at about 27 sites, with average demand reductions of about 10%. Many end-use customers have suggested that automation will help them institutionalize their electric shedding.

System Overview: The overall goal of this research is to understand technological attributes of systems that could automatically reduce electric demand in facilities throughout California upon receipt of an emergency signal or rise in the price of electricity. In this system, a price signal, mimicking CPP, will be published on a single Web services server, available on the Internet using the meta-language, XML (Extensible Markup Language). Each of the participating facilities will monitor the common price signal using Web services client applications and automatically shed site-specific electric loads when the price increases predetermined by the Critical Peak Pricing Program. The system shall be designed to operate without human intervention during the test period.

I. Objectives

The objectives of this project are:

1. Demonstrate how an automated notification system for critical peak pricing can be used in large commercial facilities for demand response (DR). Evaluate effectiveness of such a system. Determine how customers will respond to this form of automation for CPP.
2. Evaluate what type of DR shifting and shedding strategies can be automated.
3. Develop information systems for commercial customers such as energy consumption feedback, audits, and economic analysis tools.
4. Demonstrate integrated energy management using advanced controls for both energy efficiency and DR. (Sample candidate for such a demonstration is dimmable ballast.)
5. Explore how automation of control strategies can increase participation rates and DR from CPP and automation.
6. Evaluate CPP economics and the influence of various rate designs.
7. Understand the costs and benefits of CPP from the owners' perspective.
8. Identify optimal control and shedding strategies.

9. Determine occupant and tenant response.

II. Pre-Test

In preparation for CPP days, the participating sites must work with LBNL on the following tasks:

Sign Memorandum of Understanding (MOU) - The MOU is for mutual communication purposes. It allows us to ensure that you understand the LBNL agreement for collaboration ensures the payment of the Participation award.

Provide General Site Data - LBNL will request general information about your site including: facility size, use, HVAC equipment type, etc.

Define Electric Data Collection Methods - Most commercial sites have local databases that archive data from electric meters, Energy Management Control Systems (EMCS) or Energy Information Systems (EIS). Please allow for access by LBNL project staff and DRISCO.

Define Shed Strategies - Successful strategies that were used in the 2003, 2004 and 2005 tests included: global temperature adjustment, duct static pressure reset, VFD position limiting, chilled water valve position limiting, and reductions in lighting level. We encourage you and your facilities management staff to come up with innovative shed strategies that are appropriate for your site.

Establish Connectivity - Each site must be outfitted to receive the LBNL generated price signals (or the associated operational mode signals) with one of the two following methods:

1. Client Logic Integrated Relay Box (CLIR Box):

2. Internet to EMCS or EIS Gateway - If your site already has a gateway that connects the EMCS/EIS to the Internet then this method may be used. If you can currently view your EMCS data using an Internet browser then such a gateway is likely installed.

Additional information can be found at http://drrc.lbl.gov/pubs/Connectivity.pdf

Program Shed Strategies into EMCS – Once a method of receiving the price signal has been established, the EMCS can be programmed to facilitate the desired sheds upon a rise in price.

III. During the Test

Price Signal - During the the CPP period (May 1st- October 31st), each participating site and LBNL will receive a CPP notification from PG&E. LBNL will relay PG&E's signal to participants to initiate shed events. During each shed event, each participating site will

automatically shed some electric load. The shed actions at your site will be based on the strategy created ahead of time by you and your staff.

Documenting Your Shed – LBNL will collect whole-building electricity consumption data for each site in the pilot. When available, we will also collect detailed data from an EMCS or other end-use meters to help us understand the dynamics of the shed strategies.

IV. Project Report

After the test, LBNL will provide a detailed project report that evaluates the automated sheds of your site and the others. The report will compare the DR technologies and shed strategies; and develop metrics such as total kW shed, W/sqft shed, and percent of whole-building shed. The report will include the electric consumption data from your facility, a statistical analysis of the shed data (using a weather-corrected baseline), and other EMCS or related data. The report will also describe the controls and communications systems at each test site. These results will be presented publicly in academic and trade publications and conferences.

V. Project Timeline for Auto-CPP Pilot

Activity	Date	Who
Plan Shed Strategies, Connectivity, Sign MOU LBNL & Participants	May - July	LBNL & Participants
Establish Connectivity, Preprogram EMCS Shed Strategies Participants	May-August	Participants
Confirmation of System Readiness LBNL & Participants	June- August	LBNL & Participants
CPP days	May - October	PG&E
Data Analysis and Write-up LBNL	September - December	LBNL

VI. LBNL Staff:

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